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Getting past convergence



As contributing editor Jeff Evans points out in one of this month's cover story articles, *divergence* is just a word. Like the term *evolution*, it's a convenient way to describe what happens when *diverse* media forms and forces come to coalesce.

It is now redundant to say multimedia computer because all new personal computers have good graphics, sound, and a CD drive or other optical-drive intervention that the word *multimedia*, the hyperextended name of digital convergence will eventually

A phone will soon be once again just a phone, not a digital email-enabled, Web-ready, WAP-compliant, 3G mode, Bluetooth, 2.5G, SMS device.

With music, we're there already: Audio CDs went through a brief period of being referred to as digital music, but few people refer to their music as a digital audio collection—they're just CDs. Likewise, the digital nature of newer formats isn't highlighted; they are simply MP3s or RealAudio clips. The only time that the analogue-digital distinction comes up is to point out that something is not digital: for example a collector interested about a more rapid digital.

For maybe another year, digital photography will be the buzz, then it will simply become photography again. According to a recent Reuters article, the Japan Camera Industry Association says the numbers of film cameras shipped by Japanese camera manufacturers fell 6.4 percent last year, and is expected to drop 7.5 percent this year. Meanwhile, sales of digital cameras doubled last year, and will jump by as much as 50 percent this year.

In terms of units shipped, the numbers still favor the camera—11.7 million shipped versus 11 million digital cameras shipped last year by Japanese camera makers, according to the Reuters report. But Boston-based International Research Group has predicted that by 2003, the number of digital cameras sold will surpass the number of film cameras sold.

With movie-making equipment, we are living through a similar transition, where digital video camcorders are now available for sale at the same price as consumer analog camcorders.

But moving from analogue to digital is only the first part of

digital convergence. The possibilities created when all our innovations become one are reduced to zero and zero is what is really influencing how we work and play. And where is the personal computer in all that?

If the end product of convergence is information access rather than computational processing, why do you always have to use an information processing device, i.e. a PC? The answer is you don't.

August marks the 25th anniversary of the introduction of the IBM PC, a seminal event for personal computing as we know it today. But there's no denying that the personal computer industry is in a severe slump right now, and there's a lot of uncertainty about what it will look like in six or 12 months.

Price competition makes it a very good time to buy a new computer right now, but as the longer term, there will be a drawback. With fewer consumers looking for bigger market shares. And there's the ongoing discussion of the fate of the personal computer itself.

Convergence plays a critical role in that dissemination of the end product of convergence is information access rather than computational processing, why do you always have to use an information processing device, or a PUP? The answer is you don't, and it seems incredible that the three modes of access and presentation devices plugging into the data and structures will soon outnumber the processors and calculation devices.

Around the office, I know

that the incentive device of at least two editors is the Creative Labs Nomad iLikenon. Not much bigger than a portable CD player, the iLikenon is essentially a portable hard drive that holds and plays 128 plus hours of MP3 format music.

Several aspects of the work of

renowned producer called the Digital Wile. Like the Hummel Notebook, it is a battery-powered hard drive, but its target users are digital photographers who can use it to download images from a memory card. There are examples of a host of developers taking the most appropriate subsystems of the personal computer—in this case, storage—and creating new mobile products that embrace the full PC tool.

But in both cases, the personal computer is still necessary at some point. A computer is still the most efficient way to load the jukebox with all those tunes, and the Walder's songs will eventually have to be downloaded to a computer for copies, here and there.

I have heard anecdotes of people buying DV decks solely on the strength of their computer's digital-video capabilities. These Mini-cams with FireWire ports, as do most DV camcorders now, so moving video footage to a computer for editing is almost as simple as moving any other kind of data from a storage device to a computer.

And the iMac's *Movie* video-editing software makes it equally easy to organize the shots into a desired linear curve. As convergence rates in content there will always be a need for some kind of relatively powerful computer as the processing, connecting and communicating with a variety of devices, like MP3 subunits and camcorders. On the Internet, that's the home model—public or publicly accessible screen delivery content as well as e-commerce.

While a private sphere, the personal computer is already taking on the role of personal server. And it will succeed there, largely because of its chamberlain nature—today's soundstage, tomorrow movie maker, and the next day digital butler—when it what made it a success in the first place.

Have a great summer!
David Tanaka, Editor

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Readers sound off on noisy computers
In the June issue, we printed a letter from Murray Peterson, a reader who was complaining about the high noise levels of personal computers and

equipment. He wondered if other readers felt the same and posed his question. Last month we received some comments, and even more came in this month. Meanwhile, products either from Gateway or products imitating by hard drive maker Seagate, and was told that one of Seagate's development practices was to make the noise levels of its hard drives. Considered?

I agree with the letter by Murray Peterson in the importance of noise measurements. There are standard procedures for this. Some basic considerations for noise measurements are straightforward, noted fans and do complete disk drive measurements. A company doing this is <http://www.noisecheck.com>. Moreover, The Allen D&B was also a company without a fan, wonderfully quiet. Is

being as no disk I/O was happening?
Frederick Braser

I full heartily agree with Murray Peterson as he has been saying the same level of noise problem. I would gladly pay a significant premium or sacrifice overall performance to have a silent computer.

Maybe you're not alone! Let's hope that your letter is the beginning of a revolution. Doug Harwell

Thanks for the useful publication

I've just replaced a noisy hard drive and the new one is marginally better. There were no available specs on noise generation to guide my choice for a new one.

Personally, a benefit of my home office is the tranquility, which affords me the opportunity to be more productive than in bustling, noisy clients' offices.

Now that hard drive capacity and speed are more than ample for the most common file work apps today perhaps it is time that new measures of performance such as noise level be introduced. Count me in!
Richard Peterson

To all those who complain about noisy computers, I would suggest that you look at the Mac G4 Cube. This machine has no fan, and is completely silent.
Gordon Handuk

Downing the tech alphabet soup

First I would like to thank The Computer Paper for a being great resource and informative paper that we receive every month. I personally enjoy it very much.

There is, however, one thing that I would suggest that would help our fellow readers, especially reviews of new products.

When you use the abbreviations of technical terms, like example (DDR SDRAM, SDRAM), I am wondering if it would be too much to ask to include a glossary page of all the new (and almost new) terms of new products.

Better still, if the magazine has a Web site, you could post a glossary there, for the reader to conveniently browse to update their vocabularies.

It would be much a great educational spot for a lot of people, including me.

Thank you very much and best regards
Liamas Dreyfus

TCP region. This is a great suggestion, and one that we have been planning to implement. So in future issues, expect to see a glossary of terms to help you decode the tech alphabet soup. □

Saltwater tropical hobby fish

Hi—This site contains information and chat forums for those who keep aquariums with saltwater tropical fish in them. The site—which was only started recently—also has some photos of beautifully colored tropical fish. My favorites are the Royal Gramma and the Yellow Tail Darter. It also has a number of downloads and links to help those setting up and aquaria. Hopefully, it will contain more content as it becomes better known.
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2500T01	Celeron 300MHz	128MB	2500	24X	15" TFT	\$1,395
2500T02	P III 400MHz	128MB	2500	24X	15" TFT	\$1,495
2500T03	P III 400MHz	256MB	2500	24X	15" TFT	\$1,595
2500T04	P III 400MHz	256MB	2500	24X	15" TFT	\$1,695
2500T05	P III 400MHz	256MB	2500	24X	15" TFT	\$1,795
2500T06	P III 400MHz	256MB	2500	24X	15" TFT	\$1,895
2500T07	P III 400MHz	256MB	2500	24X	15" TFT	\$1,995
2500T08	P III 400MHz	256MB	2500	24X	15" TFT	\$2,095
2500T09	P III 400MHz	256MB	2500	24X	15" TFT	\$2,195
2500T10	P III 400MHz	256MB	2500	24X	15" TFT	\$2,295
2500T11	P III 400MHz	256MB	2500	24X	15" TFT	\$2,395
2500T12	P III 400MHz	256MB	2500	24X	15" TFT	\$2,495
2500T13	P III 400MHz	256MB	2500	24X	15" TFT	\$2,595
2500T14	P III 400MHz	256MB	2500	24X	15" TFT	\$2,695
2500T15	P III 400MHz	256MB	2500	24X	15" TFT	\$2,795
2500T16	P III 400MHz	256MB	2500	24X	15" TFT	\$2,895
2500T17	P III 400MHz	256MB	2500	24X	15" TFT	\$2,995
2500T18	P III 400MHz	256MB	2500	24X	15" TFT	\$3,095
2500T19	P III 400MHz	256MB	2500	24X	15" TFT	\$3,195
2500T20	P III 400MHz	256MB	2500	24X	15" TFT	\$3,295

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 64MB PC100 Memory
 120GB Hard Drive
 24X CD-ROM
 12.1" TFT XGA Display
 56Kbps V.90 Modem
 Microsoft Windows 95

Model	CPU	RAM	HDD	CD	Display	Price
2101H/Celeron	300MHz	64MB	120GB	24X	12.1" TFT	\$1,325
2101H/P III 400	400MHz	64MB	120GB	24X	12.1" TFT	\$1,425
2101H/P III 450	450MHz	64MB	120GB	24X	12.1" TFT	\$1,525
2101H/P III 500	500MHz	64MB	120GB	24X	12.1" TFT	\$1,625
2101H/P III 550	550MHz	64MB	120GB	24X	12.1" TFT	\$1,725
2101H/P III 600	600MHz	64MB	120GB	24X	12.1" TFT	\$1,825
2101H/P III 650	650MHz	64MB	120GB	24X	12.1" TFT	\$1,925
2101H/P III 700	700MHz	64MB	120GB	24X	12.1" TFT	\$2,025
2101H/P III 750	750MHz	64MB	120GB	24X	12.1" TFT	\$2,125
2101H/P III 800	800MHz	64MB	120GB	24X	12.1" TFT	\$2,225
2101H/P III 850	850MHz	64MB	120GB	24X	12.1" TFT	\$2,325
2101H/P III 900	900MHz	64MB	120GB	24X	12.1" TFT	\$2,425
2101H/P III 950	950MHz	64MB	120GB	24X	12.1" TFT	\$2,525
2101H/P III 1000	1000MHz	64MB	120GB	24X	12.1" TFT	\$2,625
2101H/P III 1050	1050MHz	64MB	120GB	24X	12.1" TFT	\$2,725
2101H/P III 1100	1100MHz	64MB	120GB	24X	12.1" TFT	\$2,825
2101H/P III 1150	1150MHz	64MB	120GB	24X	12.1" TFT	\$2,925
2101H/P III 1200	1200MHz	64MB	120GB	24X	12.1" TFT	\$3,025
2101H/P III 1250	1250MHz	64MB	120GB	24X	12.1" TFT	\$3,125
2101H/P III 1300	1300MHz	64MB	120GB	24X	12.1" TFT	\$3,225
2101H/P III 1350	1350MHz	64MB	120GB	24X	12.1" TFT	\$3,325
2101H/P III 1400	1400MHz	64MB	120GB	24X	12.1" TFT	\$3,425
2101H/P III 1450	1450MHz	64MB	120GB	24X	12.1" TFT	\$3,525
2101H/P III 1500	1500MHz	64MB	120GB	24X	12.1" TFT	\$3,625
2101H/P III 1550	1550MHz	64MB	120GB	24X	12.1" TFT	\$3,725
2101H/P III 1600	1600MHz	64MB	120GB	24X	12.1" TFT	\$3,825
2101H/P III 1650	1650MHz	64MB	120GB	24X	12.1" TFT	\$3,925
2101H/P III 1700	1700MHz	64MB	120GB	24X	12.1" TFT	\$4,025
2101H/P III 1750	1750MHz	64MB	120GB	24X	12.1" TFT	\$4,125
2101H/P III 1800	1800MHz	64MB	120GB	24X	12.1" TFT	\$4,225
2101H/P III 1850	1850MHz	64MB	120GB	24X	12.1" TFT	\$4,325
2101H/P III 1900	1900MHz	64MB	120GB	24X	12.1" TFT	\$4,425
2101H/P III 1950	1950MHz	64MB	120GB	24X	12.1" TFT	\$4,525
2101H/P III 2000	2000MHz	64MB	120GB	24X	12.1" TFT	\$4,625
2101H/P III 2050	2050MHz	64MB	120GB	24X	12.1" TFT	\$4,725
2101H/P III 2100	2100MHz	64MB	120GB	24X	12.1" TFT	\$4,825
2101H/P III 2150	2150MHz	64MB	120GB	24X	12.1" TFT	\$4,925
2101H/P III 2200	2200MHz	64MB	120GB	24X	12.1" TFT	\$5,025
2101H/P III 2250	2250MHz	64MB	120GB	24X	12.1" TFT	\$5,125
2101H/P III 2300	2300MHz	64MB	120GB	24X	12.1" TFT	\$5,225
2101H/P III 2350	2350MHz	64MB	120GB	24X	12.1" TFT	\$5,325
2101H/P III 2400	2400MHz	64MB	120GB	24X	12.1" TFT	\$5,425
2101H/P III 2450	2450MHz	64MB	120GB	24X	12.1" TFT	\$5,525
2101H/P III 2500	2500MHz	64MB	120GB	24X	12.1" TFT	\$5,625
2101H/P III 2550	2550MHz	64MB	120GB	24X	12.1" TFT	\$5,725
2101H/P III 2600	2600MHz	64MB	120GB	24X	12.1" TFT	\$5,825
2101H/P III 2650	2650MHz	64MB	120GB	24X	12.1" TFT	\$5,925
2101H/P III 2700	2700MHz	64MB	120GB	24X	12.1" TFT	\$6,025
2101H/P III 2750	2750MHz	64MB	120GB	24X	12.1" TFT	\$6,125
2101H/P III 2800	2800MHz	64MB	120GB	24X	12.1" TFT	\$6,225
2101H/P III 2850	2850MHz	64MB	120GB	24X	12.1" TFT	\$6,325
2101H/P III 2900	2900MHz	64MB	120GB	24X	12.1" TFT	\$6,425
2101H/P III 2950	2950MHz	64MB	120GB	24X	12.1" TFT	\$6,525
2101H/P III 3000	3000MHz	64MB	120GB	24X	12.1" TFT	\$6,625
2101H/P III 3050	3050MHz	64MB	120GB	24X	12.1" TFT	\$6,725
2101H/P III 3100	3100MHz	64MB	120GB	24X	12.1" TFT	\$6,825
2101H/P III 3150	3150MHz	64MB	120GB	24X	12.1" TFT	\$6,925
2101H/P III 3200	3200MHz	64MB	120GB	24X	12.1" TFT	\$7,025
2101H/P III 3250	3250MHz	64MB	120GB	24X	12.1" TFT	\$7,125
2101H/P III 3300	3300MHz	64MB	120GB	24X	12.1" TFT	\$7,225
2101H/P III 3350	3350MHz	64MB	120GB	24X	12.1" TFT	\$7,325
2101H/P III 3400	3400MHz	64MB	120GB	24X	12.1" TFT	\$7,425
2101H/P III 3450	3450MHz	64MB	120GB	24X	12.1" TFT	\$7,525
2101H/P III 3500	3500MHz	64MB	120GB	24X	12.1" TFT	\$7,625
2101H/P III 3550	3550MHz	64MB	120GB	24X	12.1" TFT	\$7,725
2101H/P III 3600	3600MHz	64MB	120GB	24X	12.1" TFT	\$7,825
2101H/P III 3650	3650MHz	64MB	120GB	24X	12.1" TFT	\$7,925
2101H/P III 3700	3700MHz	64MB	120GB	24X	12.1" TFT	\$8,025
2101H/P III 3750	3750MHz	64MB	120GB	24X	12.1" TFT	\$8,125
2101H/P III 3800	3800MHz	64MB	120GB	24X	12.1" TFT	\$8,225
2101H/P III 3850	3850MHz	64MB	120GB	24X	12.1" TFT	\$8,325
2101H/P III 3900	3900MHz	64MB	120GB	24X	12.1" TFT	\$8,425
2101H/P III 3950	3950MHz	64MB	120GB	24X	12.1" TFT	\$8,525
2101H/P III 4000	4000MHz	64MB	120GB	24X	12.1" TFT	\$8,625
2101H/P III 4050	4050MHz	64MB	120GB	24X	12.1" TFT	\$8,725
2101H/P III 4100	4100MHz	64MB	120GB	24X	12.1" TFT	\$8,825
2101H/P III 4150	4150MHz	64MB	120GB	24X	12.1" TFT	\$8,925
2101H/P III 4200	4200MHz	64MB	120GB	24X	12.1" TFT	\$9,025
2101H/P III 4250	4250MHz	64MB	120GB	24X	12.1" TFT	\$9,125
2101H/P III 4300	4300MHz	64MB	120GB	24X	12.1" TFT	\$9,225
2101H/P III 4350	4350MHz	64MB	120GB	24X	12.1" TFT	\$9,325
2101H/P III 4400	4400MHz	64MB	120GB	24X	12.1" TFT	\$9,425
2101H/P III 4450	4450MHz	64MB	120GB	24X	12.1" TFT	\$9,525
2101H/P III 4500	4500MHz	64MB	120GB	24X	12.1" TFT	\$9,625
2101H/P III 4550	4550MHz	64MB	120GB	24X	12.1" TFT	\$9,725
2101H/P III 4600	4600MHz	64MB	120GB	24X	12.1" TFT	\$9,825
2101H/P III 4650	4650MHz	64MB	120GB	24X	12.1" TFT	\$9,925
2101H/P III 4700	4700MHz	64MB	120GB	24X	12.1" TFT	\$10,025
2101H/P III 4750	4750MHz	64MB	120GB	24X	12.1" TFT	\$10,125
2101H/P III 4800	4800MHz	64MB	120GB	24X	12.1" TFT	\$10,225
2101H/P III 4850	4850MHz	64MB	120GB	24X	12.1" TFT	\$10,325
2101H/P III 4900	4900MHz	64MB	120GB	24X	12.1" TFT	\$10,425
2101H/P III 4950	4950MHz	64MB	120GB	24X	12.1" TFT	\$10,525
2101H/P III 5000	5000MHz	64MB	120GB	24X	12.1" TFT	\$10,625
2101H/P III 5050	5050MHz	64MB	120GB	24X	12.1" TFT	\$10,725
2101H/P III 5100	5100MHz	64MB	120GB	24X	12.1" TFT	\$10,825
2101H/P III 5150	5150MHz	64MB	120GB	24X	12.1" TFT	\$10,925
2101H/P III 5200	5200MHz	64MB	120GB	24X	12.1" TFT	\$11,025
2101H/P III 5250	5250MHz	64MB	120GB	24X	12.1" TFT	\$11,125
2101H/P III 5300	5300MHz	64MB	120GB	24X	12.1" TFT	\$11,225
2101H/P III 5350	5350MHz	64MB	120GB	24X	12.1" TFT	\$11,325
2101H/P III 5400	5400MHz	64MB	120GB	24X	12.1" TFT	\$11,425
2101H/P III 5450	5450MHz	64MB	120GB	24X	12.1" TFT	\$11,525
2101H/P III 5500	5500MHz	64MB	120GB	24X	12.1" TFT	\$11,625
2101H/P III 5550	5550MHz	64MB	120GB	24X	12.1" TFT	\$11,725
2101H/P III 5600	5600MHz	64MB	120GB	24X	12.1" TFT	\$11,825
2101H/P III 5650	5650MHz	64MB	120GB	24X	12.1" TFT	\$11,925
2101H/P III 5700	5700MHz	64MB	120GB	24X	12.1" TFT	\$12,025
2101H/P III 5750	5750MHz	64MB	120GB	24X	12.1" TFT	\$12,125
2101H/P III 5800	5800MHz	64MB	120GB	24X	12.1" TFT	\$12,225
2101H/P III 5850	5850MHz	64MB	120GB	24X	12.1" TFT	\$12,325
2101H/P III 5900	5900MHz	64MB	120GB	24X	12.1" TFT	\$12,425
2101H/P III 5950	5950MHz	64MB	120GB	24X	12.1" TFT	\$12,525
2101H/P III 6000	6000MHz	64MB	120GB	24X	12.1" TFT	\$12,625
2101H/P III 6050	6050MHz	64MB	120GB	24X	12.1" TFT	\$12,725
2101H/P III 6100	6100MHz	64MB	120GB	24X	12.1" TFT	\$12,825
2101H/P III 6150	6150MHz	64MB	120GB	24X	12.1" TFT	\$12,925
2101H/P III 6200	6200MHz	64MB	120GB	24X	12.1" TFT	\$13,025
2101H/P III 6250	6250MHz	64MB	120GB	24X	12.1" TFT	\$13,125
2101H/P III 6300	6300MHz	64MB	120GB	24X	12.1" TFT	\$13,225
2101H/P III 6350	6350MHz	64MB	120GB	24X	12.1" TFT	\$13,325
2101H/P III 6400	6400MHz	64MB	120GB	24X	12.1" TFT	\$13,425
2101H/P III 6450	6450MHz	64MB	120GB	24X	12.1" TFT	\$13,525
2101H/P III 6500	6500MHz	64MB	120GB	24X	12.1" TFT	\$13,625
2101H/P III 6550	6550MHz	64MB	120GB	24X	12.1" TFT	\$13,725
2101H/P III 6600	6600MHz	64MB	120GB	24X	12.1" TFT	\$13,825
2101H/P III 6650	6650MHz	64MB	120GB	24X	12.1" TFT	\$13,925
2101H/P III 6700	6700MHz	64MB	120GB	24X	12.1" TFT	\$14,025
2101H/P III 6750	6750MHz	64MB	120GB	24X	12.1" TFT	\$14,125
2101H/P III 6800	6800MHz	64MB	120GB	24X	12.1" TFT	\$14,225
2101H/P III 6850	6850MHz	64MB	120GB	24X	12.1" TFT	\$14,325
2101H/P III 6900	6900MHz	64MB	120GB	24X		

Washington State junk email law upheld, spammer to stand trial

WASHINGTON, D.C.—On mid-June, the Washington Supreme Court upheld a 1998 state law aimed at curbing the use of unsolicited commercial email, or "spam."

The unanimous decision allows the state's attorney general to proceed with a pending law-

suit against Juan Michel, a 34-year-old Oregon man accused of spamming millions of users in order to draw up sales of his book, which—among other things—teaches people how to use spam for profit.

Washington Attorney General Christine

Gregoire said she was pleased that the Supreme Court ruled with a strong endorsement of the state's new anti-spam law.

"Consumers and businesses pay a heavy price in money and lost time because of those who use the Internet to distribute deceptive com-

mercial mailings to people who never asked for them," Gregoire said.

The state law prohibits the sending of commercial email that contains misleading information in its subject line or uses a bogus return address as third-party domain name when address without permission. Penalties brought by the state under the Consumer Protection Act can reach up to \$527,000 per violation, while consumers and Internet service providers (ISPs) can sue for \$250,000 and \$500,000 per violation, respectively.

The lawsuit alleges Michel and his company National Networks sent junk emails with the message, "Did I get the right email address?" in the header to induce recipients into opening and reading the message. The suit also accuses Michel of using false return addresses to keep people from responding.

King County Superior Court Judge Thomas Robinson dismissed the case last year, arguing that the new law violated the Commerce Clause of the Constitution. That decision led Supreme Court ruling that held individual states could not pass laws that effectively regulate interstate commerce.

In upholding the law, the state Supreme Court found that "...the only burden the act places on spammers is the requirement of truthfulness, a requirement that does not burden commerce at all but actually furthers it by eliminating fraud and deception."

The case will now be remanded to the Superior Court for trial.

Michel's attorney Luis L. Gonzalez emphasized that the decision was not about the guilt or innocence of his client, but rather symbolizes the struggle between state and federal governments over the intent of the Commerce Clause. As such, Gonzalez said he expects that the U.S. Supreme Court to be the ultimate arbiter of the law's constitutionality.

"That ruling will supersede any state court ruling," Gonzalez said. "In the meantime, we are going to proceed on the assumption that this is the case that the United States Supreme Court will decide to reverse, and that our argument is the correct one."

Scott Austin Mueller, chairman of the Coalition Against Unsolicited Commercial E-Mail (CAUSE), applauded the ruling, but said the tentative nature of open markets that the problem will continue as long as Congress delays passage of federal anti-spam laws.

"We'll see how strong federal legislation giving consumers and Internet providers the legal tools with which to defend themselves, it's only through the actions of local and state law enforcement that spammers will be convinced to stop their fraudulent and abusive practices."

The House of Representatives is considering two separate bills to curb the use of unsolicited commercial email. While one of the measures, co-sponsored by Rep. Heather Wilson, passed the House by an overwhelming margin of 423-1 last year, the bill this year needs far less support and has drawn fire from financial services companies, who claim the legislation would stifle legitimate communications between companies and their customers.

The Supreme Court's decision in *ashe v. al* <http://www.wa.gov/govspc/justice/decisions/04/06/040601.htm>.

—Alexeyev

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- 400MHz Core Clock
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The new shape of convergence

The convergence of human knowledge, business information, and artistic expression into digital form, accessible via computing devices connected to a universal network, is almost a reality

By Jeff Friesen

A convergence becomes inevitable and a part of everyday life, it is taking shape and affecting our lives in ways unanticipated even a few years ago.

In the digitally converged world a decade or even five years from now, every imaginable form of knowledge—from Hollywood films, to high school courses, to molecular designs of new life forms—may be part of our common, interactive world library, in the attic, in school, or home, available to all of humanity.

Imagine, around 2005, only four years from now, that everywhere you go, you carry a palm-sized wireless device that is a combination of a phone and a pocket computer and a TV set.

It automatically lets you connect with the public voice phone and videophone network wherever you go, as well as to your personal computer, your family, school and office network servers, music and internet, the Internet, and satellite TV networks.

Your portable device also constantly talks to (or at least listens to) the other personal devices used by most of the people, vehicles, stores, and buildings around you at any given time.

At home, your family has an assortment of interactive convergence devices, including a family network server, PC-like information appliances, and entertainment audio-video systems. There are remote all forms of digital media over the Internet, and in cars interact with video, music data, maps, educational programs, Internet networks, and many other Internet services.

In a daily life in the Internet are the Internet in the convergence: was a VHS VCR, a cassette tape player, an analogizer off phone, floppy disks, a fully analog-digital, now-flat-panel TV, a 360bps modem, a PlayStation, and a Thomson Hi Windows PC. Nobody wants these, even for \$5 at a time.

Most of the technologies become one of the components required for the preceding description of convergence already exist, the product of 30 years work and hundreds of billions of dollars spent in research and development of digital media technology. What is still lacking, though, is the final integration of all of the component parts of the media converge into a fully usable, single, standards-based medium.

We are in the last stages of film history: television. From yesterday's media technology to the one new medium. Depending on how old you are, it, you grew up in North America you will have lived through some or all of the following:

- The desktop PC has evolved from a stand-alone, monochrome, text-oriented data processing tool, to a networked multimedia device. Today's PC can handle many of



the different forms of media that are components

of convergence: digital audio, graphics, video, CD interaction, multi-user online software, and so on. The laptop PC, though more expensive and more limited in some respects than in offering portability, better graphics, and usually lacking built-in digital video capabilities, has the great advantage of being able to travel rather than tethering the user to one location.

- In the 1960s and '70s, publishing began to compete, starting with computer photo-setting, replacing hot metal, which became desktop publishing with the advent of the PC in the '80s, then morphed into electronic pre-press in the early '90s, and then merged with the Web and digital color and vector-illustration in the late '90s.

- The telephone option, originally an analog voice medium, was rapidly adapted to carry data in the '60s and '70s. It then evolved to become a computer-linked, digital optical fiber format in the late '80s and '90s. Wireless analog phone took off in the early '90s, and are now as the process of quickly being replaced by digital cellular phones, while a huge global dog fight over standards inhibits the specific adoption of high-speed, high-quality wireless Internet services.

- The recording industry rapidly moved away from analog vinyl disks and magnetic tape cassettes to the higher priced, cheaper to make, harder to copy, more profitable digital compact disc (CD). At the same time, musicians and studio opera-

tors adopted PC-based digital audio systems in the '80s and '90s. The music industry was disrupted accordingly into the Internet age over the past three years by the music industry of MP3 pirates also known as music fans.

- Television, long established as an analog broadcast and tape format quite separate from computer technology, became a hybrid medium in the '80s as devices like the Amiga computer and the Video Toaster blurred the boundaries between video and computer graphics. Following the adoption of new digital standards—including the advent of digital multicasting, high speed FiberWire transfer of video, high-definition TV (HDTV), and digital satellite and cable TV networks, which occurred through the mid-'80s to the present—television has largely converted the production side of the industry to digital methods. The final, more difficult, stage of the convergence of TV as a digital standard is the move from NTSC (North American Television Standards Committee) analog television to all-digital HDTV. This evolution will likely take the better part of a decade, due to the installed base of hundreds of millions of analog TV sets. HDTV adoption also need to drop dramatic TV set prices and the amount of content available for the format needs to grow, which will take time. For now, a growing appetite for digital video is being satisfied by DVD discs, and digital satellite and cable TV services. A parallel

development in Web-enabled streaming media provides low quality for low bandwidth. The life of this is a mainstream technology depends on how quickly the world moves to high-speed access, both wired and wireless. In the last two years,

DVD has steadily added creep to the VHS tape format, due to the better quality of digital sound and images, on-board playback, and other interactive options, such as multiple languages, and user-selectable versions. Analog tape cassettes and film cameras are steadily being replaced by their new digital still-camera and motion video cameras. Then the good old movie theater, assuming the has enough of film technology, is on the verge of being upgraded to high-definition, (digital) digital video projection led by satellite distribution networks.

- In offices around the world, file folders, notepapers, and filing cabinets have been increasingly replaced, often by a secure software, personal information managers, and server arrays—all of which are connected to the Internet. There are more paper documents being

produced now than ever before, but increasingly they are hypertexts of electronic records. Whether electronic books will seriously challenge paper books remains to be seen, as the tactile experience of traditional reading still has much appeal. However, with so much time the physical records containing web digital media, it may be wondered where people will find the books for paper books, magazines, or newspapers.

- Play time for children, once dominated by traditional mass media like film and comic books, is now shifting to interactive video games and the Internet.

- Small-mail has been reduced from an essential lifeline to a channel mostly for junk ads that go straight into the recycling bin. People, especially the young, are addicted to the immediacy and intimacy of online chat, instant messaging, and email. Even the fax machine, with its sustainable demand for boxes and paper, is expected to begin fading within the next few years as e-mail and word processing suppress.

- Education in traditional classrooms, in front of a teacher, is increasingly supplemented with interactive CD materials, online help, Web-based learning, and Web-conferencing.

- Libraries, encyclopedias, atlases, and other traditional paper-based reference and research sources are being replaced by Internet search tools like Google, and by knowledge management software, and data warehousing and data mining systems. □

From memex to Xanadu

A short history of the quest for information anywhere

By Jeff Evans

Most of the key innovations leading to the modern world somehow happened in the U.S. after the Second World War. Only in the U.S., it seemed, was there the critical mass of optimism, commercial energy, research funding, and utopian belief in this speech, which would combine with a large military industrial complex to make the convergent world a reality.

In 1946, Vannevar Bush, a former president of the Massachusetts Institute of Technology (MIT) and director of the U.S. Office of Scientific Research and Development during the war years, published an article, "As We May Think" (<http://www.frl.mtu.edu/ehd/Reid/Reid/comp/hist/hist.html>), which was to have enormous influence on the future of computing and convergence. This short essay imaginatively outlined a system for organizing all knowledge and making it easily accessible to any individual.

"Consider a future device for individual use," he wrote, "which is sort of an improved private file and library." It needs a name, and, to coin one of random, "memex" will do. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanism so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.

"In essence of a desk, and while it can presumably be operated from a distance, it is primarily for the purpose of function at which he works. On the top are slanting translucent screens, on which material can be projected for convenient viewing. There is a keyboard, and tray of fixtures and lenses."

Thus theoretical descriptions of a universal knowledge machine is recognized by many of those who went on to create computing and

screening technologies as one of the primal visions that provided a framework for the information age.

Bush was aware of the usefulness of computing devices for doing repetitive mathematical calculations. He had supervised the creation of one of the first computers during the war, but his real genius was to focus on the need to integrate all forms of knowledge in a way that was usable by an ordinary per-

Vannevar Bush's theoretical description of a universal knowledge machine is recognized by many as one of the primal visions that provided a framework for the information age.

son, his preschool parents, and to consciously build the technology to enhance people's holistic ability to understand and share knowledge.

Directly inspired by Bush's article was Douglas Engelbart. While working at an aeronautical research lab in the '50s, Engelbart devised a more specific model of an integrated method of using computer technologies to enhance human abilities. Engelbart conceived of a computer user interface that would allow users of information systems to use information, make connections between different kinds of information, and collaborate with other people over electronic networks. This was the theoretical basis for widely usable computer devices and, eventually, the Internet.

Engelbart, moving on to work at Stanford University in California in the early '60s, created the On-Line System (NLS) designed to augment human abilities through "asynchronous collaboration among users distributed geographically." This was perhaps the first completely integrated concept of fusing computers from single-task information processing systems to open-ended communications, learning, and collaboration systems that would help many people anywhere on earth to work together.

By the early '60s, to adapt computer and information science technology into systems to augment human abilities, Engelbart and a couple of colleagues had assembled/comprehended a toolkit that included a windowing graphical user interface, a pointing device for making selections (the mouse), hyperlinks (electronic links between related information), word processing, email, groupware (collaboration), videoconferencing, non-configurable and programmable software, custom design standards for visual interfaces and color key.

Working as an academic research consultant, Engelbart failed to patent his invention. This allowed his ideas to percolate freely to others, including James H. Panko, Allen Research Center (PARC), and Steve Jobs, directly to Apple Computer, and from there to Microsoft, IBM, and many other firms.

It cannot be overstated how valuable Engelbart's outline was to humankind. By helping make his ideas proprietary, he greatly sped their adoption by the whole computing industry.

In the meantime, however, in a 1964 article, another MIT scientist, Martin Goodenough—who was also directly inspired by Bush's corner article—defined the remaining component of a universal information machine, the network.

Goodenough pointed out that, useful as a single computing device was for storing, manipulating and accessing information, the real benefits of computing could only be achieved with the creation of a large information network. The network could make all knowledge accessible to remotely located users, and allow the user to communicate and collaborate with each other. See *Microsystems: informed design*. "The network is, the computer," is a precise summary of Goodenough's theme.

Instead of having individuals at a personal device, however powerful, Goodenough advocated the creation of an "information utility," along the lines of the phone company, or power and gas utilities, to allow universal distribution of computing and electronic media, and two-way interaction of people with storehouses of knowledge, and with other people.

Goodenough imagined that this information utility would revolutionize finance, education, and science. He helped crystallize the thinking about how to make the universal network that became the Internet.

A year after Goodenough's article, a young visionary named Ted Nelson proposed a multi-year framework for accommodating information of many types, and interactive processes of many kinds, which he named Xanadu.

Nelson coined the word hypertext, though the concept had already been coined by Bush and defined more precisely by Engelbart. Nelson, who was more of a dreamer than a doer, never actually completed the development of his Xanadu project, but he presented it so effectively in the computing community that his ideas were widely picked up and acknowledged by the people who actually went on to refine the Internet and the World Wide Web. ☐

Convergence—it's just a word

Convergence is a buzzword for a perfected integration of technologies using up the, integrated or digital media, available to any person or group of people over a network, which enhances their abilities of all sorts.

In 1981, the term "desktop publishing" was coined to describe a cheap, simple home of layout, design, and typesetting performed on a personal computer. Essentially, the term wasn't needed: anyone at his home could do the very thing, now published.

Similarly, "multimedia" was a rather lame term for integrated various media, such as sound added to a slide show, or interactive CD-ROMs that combined pictures, text, and sound animations. Eventually, multimedia was just the way computers worked, and the term has largely been retired.

Convergence is potentially a bigger deal than either desktop publishing or multimedia, because its impact on our lives is likely to be more far-reaching and harder to predict. We can see people's daily habits being changed by cell phones, Palm PDA's, laptops, and high-speed Internet.

What will happen when these technologies become more widespread, cheaper, and easier to use is little's I will work because even such dispersed geographically? We'll soon find out.

In the meantime, the concept of convergence is a useful one, if it helps us measure how well digital technologies are working together, and how much value networked products and services are providing to our lives.

—Jeff Evans

Integrated knowledge in 290 BC

In the ancient world, the most ambitious attempt to integrate all kinds of knowledge was the creation of the great library of Alexandria in 290 BC. The 300 years of the wisdom of the world, from mathematics and astronomy to politics and war, was accessible to anyone who could get to the library and search its shelves of up to 700,000 scrolls.

In addition to the library itself, the great rulers of Egypt sponsored a community of scholars and scientists who integrated the mathematics and sciences of many and established the intellectual basis of Western culture.

However, the wisdom of the established academy of a physical library was made apparent as accidents, illnesses, and religious intolerance resulted in the private burning and eventual destruction of the library and its scholarly community.

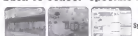
—Jeff Evans

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Happy 20th birthday, IBM PC!

From the IBM PC's launch to... the retirement of the personal computer?
The two incredible decades since Big Blue unveiled its modest little machine

By Jeff Kresner

On Aug. 12, 1980 International Business Machines Inc. publicly unveiled a radically new product, the IBM PC. It was an odd-looking thing, a big, greenish-grey metal case with a large base, with a small, lumpy-looking monitor on top, and a keyboard that seemed to be stuck on its front without regard for proportion or consistent aesthetic balance.

Compared to the contemporary Apple II or even the Osborne legible computers, it was pretty clumsy. Yet, as spite of its looks and a lack of early support by most of IBM's senior management, the IBM PC quickly took over the personal computing market, and continues to be a major influence 20 years later.

IBM's core company had been developed recently in a little over a year by a small team of IBM engineers. Compared to the more than \$1 billion (in 1980 dollars) that had gone into the creation of the IBM System 360 mainframe in 1964, the company's investment in the new IBM PC was pretty small potatoes.

Yet that one product would change IBM fundamentally (and almost bring about the company's demise), give rise to a large global



colleagues, and made Bill Gates the world's richest man.

How did this orphan child of Big Blue come to be? Why has it had so much influence over the world of computing, and where will it go in the years to come?

Personal computing, IBM style

The original IBM PC was based on the Intel 8088 microprocessor chip that poked along at 4.77 MHz (although an earlier Intel 8086 chip was available, and was considerably faster and could use up to 1 MB of RAM,

IBM decided on the weaker chip, to save money in manufacturing).

The entry-level model, with 16KB RAM, a 5.25-inch floppy drive, and an acetate, was priced at about US\$1,600 (with inflation and currency exchange, this is the equivalent of about \$4,500 Canadian today). More fully equipped models, with 64KB to 256KB of RAM, two floppy drives, color graphics card (up to eight colors at 320x200 pixel resolution, or monochrome at 640x480), monitor and printer, cost the equivalent of up to \$12,000 at today's funds.

The unofficial rule

IBM staffers were at best ambivalent in their attitude toward the IBM PC. Although it was the new baby in the IBM family, it was not the favorite child. In fact, most IBM managers and sales people regarded the entry-level PC merely with indifference or outright hostility, and the IBM PC in particular was a kind of embarrassing relic of the IBM line, better ignored than celebrated.

The old IBM corporate culture was one of towards centralized, mainframe-based corporate computing. The IBM PC (IBM tried to copyright the use of the initials PC as a brand name, like Xerox or Symbolics

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64GB RAM	\$332283904000999999999999999999999999999999.99
128GB RAM	\$6645678080009999999999999999999999999999999.99
256GB RAM	\$13291356160009999999999999999999999999999999.99
512GB RAM	\$265827123200099999999999999999999999999999999.99
1GB RAM	\$5316542464000999999999999999999999999999999999.99
2GB RAM	\$106330849280009999999999999999999999999999999999.99
4GB RAM	\$212661698560009999999999999999999999999999999999.99
8GB RAM	\$4253233971200099999999999999999999999999999999999.99
16GB RAM	\$85064679424000999999999999999999999999999999999999.99
32GB RAM	\$170129358848000999999999999999999999999999999999999.99
64GB RAM	\$3402587176960009999999999999999999999999999999999999.99
128GB RAM	\$68051743539200099999999999999999999999999999999999999.99
256GB RAM	\$1361034870784000999999999999999999999999999999999999999.99
512GB RAM	\$272206974156800099.99
1GB RAM	\$544413948313600099.99
2GB RAM	\$10888278966272000999.99
4GB RAM	\$21776557932544000999.99
8GB RAM	\$4355311586508800099.99
16GB RAM	\$87106231730176000999.99
32GB RAM	\$174212463460352000999.99
64GB RAM	\$34842492692070400099.99
128GB RAM	\$696849853841408000999.99
256GB RAM	\$1393699707682816000999.99
512GB RAM	\$2787399415365632000999.99
1GB RAM	\$557479883073126400099.99
2GB RAM	\$1114959766146252800099.99
4GB RAM	\$2229919532292505600099.99
8GB RAM	\$4459839064585011200099.99
16GB RAM	\$89196781291700224000999.99
32GB RAM	\$1783935625834004480009999999999999

advised a totally different philosophy it was actually for the individual user.

The "killer app" that justified the use of a PC in business was the spreadsheet, notably of Lotus in the VisiCalc program, later as Lotus 1-2-3, and eventually in Microsoft Excel. Next in line were word processing, programming, databases, and games software.

The IBM PC was initially aimed mainly at personal buyers, not corporate IT departments. In fact, IBM arranged for the lines and PC inventory small chains to sell the new computer directly into the home and small business market.

At last, most IBMians regarded the IBM PC as a toy, and it wasn't, as a possible competitor for the high-range minicomputer corporate computing business.

Inexpensive and simple PC networking options were still years away in 1983, so the IBM PC was of economy a standalone tool. The first movement towards the network world occurred after Rhaps Microsystems brought the modern architecture of the world's workstations (minicomputers) to the PC market in 1981.

Modems had been developed at Bell Labs in 1960. They seemed to have PC market as the best available connection device to connect remote personal computer data over regular telephone lines. Promoting online services such as CompuServe and The Source had opened in 1979, and telecom software was added as a category in the rapidly expanding library of PC software.

The Revolution open

IBM's timing in introducing the PC in 1981

actually turned out to be excellent: the company launched a good product into the market just as the PC was picked up in North America.

Originally, IBM representatives declared that they expected to sell about 500,000 of the new computer. In fact, in 1982 the company sold more than 200,000 IBM PCs. Improvement in this number was, however, IBM was not immediately the market leader.

In 1982, the Commodore VIC 30 sold 600,000-plus units, it did the Apple 400 and 800 and the Tandy/Ranfacet. These

normally command.

However, to its surprise, IBM had trouble keeping up with demand, as the PC flew off the store shelves. A third-party software community also sprang up much faster than IBM was used to, producing first-rate office software, word processors, and spreadsheets. Faced with "urgent user" demands for more speed and storage, IBM moved quickly to a PC XT version, based on the faster Intel 80286 processor that it had under development, a hard drive controller, and up to 1 MB of RAM.

The IBM brand name and logo, it seemed

In a list of IBM's proudest achievements on its corporate Web site, the IBM PC is curiously absent. Perhaps it's because so much of the underlying technology of the 1981 machine was borrowed or bought...

Intel's Intel 80486 sold 150,000, the TBI-80 250,000, the Apple II Plus sold 270,000 and the Oberon 1,000,000. IBM entered the market late in time, before any other player began to dominate it.

Compaq also introduced its IBM-compatible MS-DOS computers in 1982, beginning the clone war. That same year, Tandy made one of the computer clones of the IBM PC was modest, as the company really didn't know how to run a product would be returned, and the PC group within IBM didn't have total support from management, as the commitment to spending the existing and advancing budget that a user IBM product would

not, was worth something—a lot, actually. By 1983, two years after launch, IBM was the leader in the PC market.

Over the next decade and a half, IBM's competition, a complementary team that was originally was much weaker than by PC clones, was replaced by Wintel (a combination of Windows and Intel) to reflect the changing reality of the industry. Microsoft and Intel technology drove the PC market, while IBM became just one of many PC makers.

By the year 2000, more than 135 million Intel- or AMD-based personal computers were being sold worldwide every year—more than 30 million of which spent an IBM logo. All 135 million are direct descendants

of that first IBM PC. With the exception of systems from Apple (which still sells a few million personal computers per year), all of the other personal computer platforms of the 1980s have vanished.

This would seem to be a considerable success story for the IBM PC and its ilk, yet the IBM PC marked the PC revolution more by good luck than good management, and the "New Wave" IBM is currently eagerly looking ahead to a "post-PC" future, which nonetheless is Internet version of the old, continued "big iron" computing model of IBM's glory days before the PC came along.

The post-PC era

In line with its embrace of the Internet and Lotus, IBM is now firmly in the "PC plus" or post-PC camp. IBM chief executive, Lou Gerstner, has declared that the PC will be only one of many Internet-connected platforms to share the pervasive computing environment for business and consumers in the future.

In March 1999, Gerstner pronounced the IBM policy that "the PC is dead." Repeating further, Gerstner said, "It is not to say that PCs are going to die off, but more that institutions founded when the IBM PC was delivered in 1981, but the PC is again as the driver of customer buying decisions and the primary platform for applications development is over. It has been supplanted by the network."

Referring to a concept of "deep computing," in which extremely powerful networked computers can solve very sophisticated problems, he said, "In deep computing we are already applying [IBM technology] to real

Continued on page 34

Granite System

AMD-K7 Duron 500MHz CPU & Fan
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Full Warranty
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16" 300MHz Color Monitor
\$178 Special price with upgrade

Ruby System

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16" 300MHz Color Monitor
\$246 Special price with upgrade

Emerald System

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16" 300MHz Color Monitor
\$988 Special price with upgrade

Diamond System

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16" 300MHz Color Monitor
\$1,288 Special price with upgrade

NEC1530v
\$578.00

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Memory: Intel Celeron 300 333MHz Processor
Storage: Celeron PC133 SDRAM
Floppy: Parasector 1.44MB 3.5" 10T Floppy Drive
Monitor: 15" RGB AKA 15" SuperPanel™ (MS) Flat-Edge
Video: Integrated Video 1024x768 16.7M Colors
Case: 16" ATX Tower Case with 300W Power Supply
Keyboard: 16" 90° P102 Keyboard
Mouse: Logitech MX Integrated Mouse
Video Card: MSD V30 Integrated Video Card/Adapter
Bezel: 18" 15" Integrated Bezel
Drive: 10X UDMA IDE CD-ROM Drive
Audio: 16" 1600 Series Speakers
Warranty: Full Warranty
Package: One Month Internet Package

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Dynadisc Web pages using PDP: Part I

Continued from page 30

will not at all that is displayed to the browser in the straight HTML code—this is because the server interprets the code, and only displays valid HTML to the browser.

To give you a further hint of what can be accomplished using PDP (even) the following code into the previous code listing, and

before the <

```
<p>
<img
src=HTTP_USER_AGENT,
</p>
```

When you view the page (after getting it on your Web server), you will see a display

tion for the type of browser you are viewing the page with before the title itself. Using such code in a more complex fashion, you can do simple browser direct revisions at the server level, providing you and your users with a performance increase when you do a browser or detect at the client host (such as using a JavaScript engine built into a Web page, which has to be run by the user's browser). CJ

Next Issue: Getting more out of your Web server using PDP

Kelly Schlegel-Richter welcomes any comments, suggestions, or HTML tips you may have. You can e-mail Kelly at kelly@bluegenesis.com. Or, look on CD published by Prentice Hall, Cnr CD ISBN 0-13-06954-4, is available in bookstores. Previous articles in the series can be found at <http://www.dynadisc.com/mt/>.

Personal computing before IBM PC

I was greatly inspired by that successful personal computer about six years after the personal computer industry began. In 1975, Apple Computer magazine set a clear picture of computing called the Altair 8800, made by a company called MITS in Albuquerque, N.M.

At its launch in 1974, the Altair was the first real personal computer that any individual could order and own. It cost \$399.95 to order by mail, required four or five hours of hours to assemble, and was built around the Intel 8080 microprocessor processor chip, with 256 bytes of program memory.

Two kids named Bill Gates and Paul Allen had just written a version of the BASIC (Beginner's All-purpose Symbolic Instruction Code) programming language that could be used with the Altair. In company's vision, including Ed Roberts, the head of MITS, there were thousands of individuals who wanted their own personal computer and software to go with it.

Gates and Allen used MITS own support of their BASIC software, which was being widely played (they said), and Roberts left the fledgling PC industry, eventually becoming a country doctor. However, the duo was not. The personal computer industry had started, and it grew rapidly.

In traditional computer industry executives, the very idea of a personal computer seemed ridiculous for a company like mine. For those, the founder and chief executive of Digital Equipment Corp., stated in 1977, "There is no reason why anyone would want a computer in their home."

He was completely wrong, and had been demonstrably wrong for over two years before he made that remark, but the personal computer was breaking out of sight and out of mind, and before the noise of big computing.

In 1976, another personal computer hit, called the Apple II, was launched by Steve Jobs and Steve Wozniak. In 1977, this was followed by the pre-assembled Apple II, and was joined in the early days of personal computer market by products from Tandy (the TRS-80), Commodore (the CBM line computers), and later the Personal Electronic Systems, or PET, and some others. The Commodore PET was the first computer to sell more than one million units.

(For a concise chronology of the pre-IBM PC days of personal computing, go to <http://www.dynadisc.com/typhons/typhons/>).

As personal computer sales went from a million to a few million, IBM eventually had to take notice of the phenomenon, and the company realized that if it was going to play in this fast-moving new market, it would have to move quickly too.

—Jeff Evans

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Printing by laser light

TCP Lab looks at entry-level laser and LED printers for the small office

By Sue Connolly

Many people probably wouldn't consider putting a laser printer into their home or home office. Why not? Generally, the top three reasons are cost, cost, and cost.

Although laser printers have a reputation for being pricey—and, therefore, suitable only for large office environments—they are not as expensive as you may have been led to believe. Of course, it's easy to spend as much as you'd care to on higher-end laser printers, which offer much better speed and other performance and convenience features, but entry-level laser printers can adjust several pages per minute and cost little more than high-quality inkjet printers.

For someone who needs high-volume printing, the higher initial cost of a laser printer will certainly be offset by lower printing costs. With a \$50 adjust cartridge, you'd be lucky to print much more than 100 sheets at highest quality reproduction.

Contrast this with a \$100 laser cartridge for a laser printer, which can yield 2,000 or more pages. Added up over the course of a year of operation, you may find the inkjet costs far more just in ink costs, even if the initial hardware cost was cheaper. Obviously, the more you print, the more the equation tips in the laser's favor.

Further, while inkjet printers can offer a splash of color on your typical business page, the speed of colors you can't go up to that of laser printers. Laser printers designed for a heavy-duty business environment can routinely output 30 pages or more every minute, which is essential, you don't want to be sitting around as inkjet pages crawl out of the printer. Let alone waiting for the ink itself to dry before you can start handling the pages.

What is "laser" printing and how does it work?

The term "laser" printing typically refers to the printers of laser electrophotography, which is technologically similar to what goes on inside a standard photocopier.

Essentially, a laser beam is shot at a moving surface, which is coated



in different parts along the surface of a charged drum. When the laser hits the drum, it "moves" the charge on the drum, which then attracts laser sitting in a neighboring compartment. The laser is rolled around to the paper at which point it finds a place by a laser beam—essentially a giant laser that bounces it to the paper.

While this is happening, a wafer on the opposite side of the drum just takes the image ink off of the drum, the drum is recharged, and the whole process begins again.

The big downside of this method of printing is the mechanical nature assembly, which has to reform repeatedly over the entire width of the drum unit. This can lead to blurry output around the edges if everything is not aligned properly because it's also a moving part, it can result in reliability problems over the life of the printer.

One technology that is slowly becoming part of the laser printer field is LED (light emitting diode) printing. Instead of a laser and mirror assembly, an LED printer uses a long array of small LED diodes that stretch across the entire drum. With this set-up, only the

Continued on page 49

Elementary, my dear Photoshop

Adobe's latest image editor delivers handy mix of power and convenience

By Ernie Wassend

Adobe Photoshop is generally held up as the pinnacle of image editing software, and not without reason. It packs in almost every conceivable feature for manipulating raster images, it imports and exports most file formats, and supports plug-ins for all kinds of extended functionality.

Photoshop Elements 1.0



from Adobe Systems

http://www.adobe.com

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104,023,241

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Continued on page 46

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Elementary, my dear Photoshop

Continued from page 42

Unbelievably, no one else has it quite so easily. It can cost a cool grand to pick up Photoshop at your local computer store. The cost is a no-brainer if you're a graphics professional, but intermediate-level users and amateur computerists that need only a fraction of Photoshop's power will likely balk at a price

tag almost equal to that of a new computer.

That gap in the low-to-medium range has recently been filled by programs like Adobe's First Step Shop, which has most of Photoshop's features at a much lower price (about \$50).

It's not that Adobe hasn't tried, gentlemen. Because it has put some spine in the market, Adobe Photoshop, which for a while seemed to be beset with every digital com-

ics or image problem on the market, is perfect for novices, but with its walled-in training wheels it's easy to outgrow. Photoshop LT, a stripped-down version of its new-rival, dropped not a little but made a big mistake: was leaving out the automation features, at least First Step Shop can do batch image conversions. And there there was ImageReady, another scaled-down Photoshop, this time

optimized for this work. It turned about a year as a stand-alone product before being folded into the Photoshop 5.0 package.

All of which is to say that Adobe has been a man never room to conquer the mid-level market. That is, until the recent arrival of Photoshop Elements.

I decided to put Photoshop Elements to the test by using it exclusively for graphics work for at least a month, converting to Photoshop or ImageReady only if I absolutely had to. In truth to my surprise, I hardly missed any two features.

I only missed the full version of Photoshop needed for a particularly complex batch-processing operation. (Photoshop Elements batch operations are limited to format conversion, resizing, and file naming) and ImageReady's ability to give us its first function (which quickly gets rid of common background-color errors).

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Fig. 1: Photoshop Elements' Bridge palette

Photoshop Elements derives its power from something that is often a weakness: it tries to be all things to all people. But instead of just choosing to feature willy-nilly, Adobe took the best of what came before it and made usable decisions about what to leave out. For the most part, the missing features are simple (such as, in Photoshop Elements and other modern like CHIT and Lab—features generally reserved for hardware image-manipulating wizards. (Photoshop Elements can, however, export their images by converting them to RGB.) If data was a software cookbook, the recipe would be something like this: Take most of Photoshop 5.0, add some of ImageReady, sprinkle a dash of PhotoDisc, and wrap the whole thing in the Photoshop 5 interface. Simple, and you have efficient power and simplicity.

When you first start the program, a Slide palette appears at the upper right corner of your screen. Its job is to explore what selected functions and palettes are for in the form of a large, clear graphics that guide your attention. The cursor can click the More Help button for further details on the knowledgebase can assist it and more on. If you really need the screen space, you can close the palette or move it to the palette with a docking icon near the top of the screen.

Similarly, people want to image editing can try out the Bridge palette, which provides step-by-step instructions for such things as adding drop shadows, connecting colors, and colorizing grayscale images.

Most of Photoshop's functionality is

Continued on page 48

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Printing by Inner Light

Continued from page 49
tag to a file name.

The repeat button was a nice touch (though we've seen such buttons before, mostly on scanning products), automatically reproducing our last job (in our case, all 48 pages). Duplexing also worked quite well, printing the page out most of the way, but

making it back onto the printer at the last second to print on the other side.

One truly nice feature of the System printer is its compatibility with Macintosh, especially the inclusion of PostScript Level 3 (many other printers we've seen lately only use Level 2).

Also, with the separate tower and drum configurations, the consumables part of the

equation is much more attractive, since you don't have to replace the whole cartridge every time you run out of toner.

Hewlett-Packard LaserJet 3200dn

From Hewlett-Packard Company

<http://hp.com/go/lj3200dn>

Suggested retail price: \$2,299

Cartridge replacement cost: \$233



- 18 ppm
- Laser desktop/printing speed
- 1200 dpi resolution
- 8 MB internal memory (32 MB maximum)
- PCL 5, PCL 6, PostScript Level 3
- 250-sheet paper input (for tandem variety of paper sizes, including letter, legal, A4, and B5)
- 400-sheet multipurpose feeder
- Paper feed rotates on level of input tray
- Parallel, USB, and network networking
- Bidirectional networking
- Compatible with Windows 9x/NT/2000, Mac OS
- Toner life: 25,000 or more, and more via networking
- One-year warranty

Setup for the HP LaserJet 3200dn was incredibly easy using the USB port: after Windows 98 automatically detected the printer, we pointed the PC to the correct directory on the setup-CD-ROM and most of the software and drivers were automatically installed. Installing the PostScript drivers required a separate manual installation, but the included instructions stepped us through the process without any problems. When plugged into the network, the printer automatically obtained an IP address and was ready to go.

One problem we had, installing the printer cartridge was easy enough, but the cartridge contains a security tab that blocks into the molding, and there were no clear instructions on the cartridge itself indicating that the tab has to be pulled to insert the toner. Evidently, we were granted a free blank sheet before we figured out what the problem was. It's a very clever and efficient design, but it could certainly be more user friendly.

Print quality was excellent throughout our testing. At best quality output, the printer took just two seconds and 44 seconds to output our 48-page test document. Switching to "faster printing" and lower resolution took the same amount of time and output was slightly less bold, though still very readable.

The only major concern we have with the printer is that it does not have an LCD panel, which means you can't easily obtain the status of the printer, search through the defaults and setup options, etc.

You can print out a self-test page that gives you a lot of information (networking, print settings, and more), but it doesn't have the same accessibility as with printers that allow you to scroll through the information and select what you want and make changes.

The upside, however, is that the printer is fast, extremely compact, and comes with a lot of connectivity options, making it a fairly flexible device despite the above-stated limitations.

Lexus 3200dn

From Lexmark International, Inc.

<http://www.lexmark.com/mw>

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- 60-sheet multipurpose feeder
- Compatible with Windows 95/NT, Mac OS, Linux, and Mac
- One-year warranty

Based on the assembly line, the TS300 is one of Lexmark's hottest new printers, and one of the first without the Opus name. The TS300 is the networked version of the entry-level model, but offers features not also available in the basic TS300 despite the networking component to come at it a very reasonable \$1,195. The TS300 features built-in duplexing but no networking (the suggested retail price of \$1,195) and the TS300n offers both features.

Continued on page 52

TCP Test Lab: Laser printer survey

	Brother DL 9000	Brother-Peacock LaserJet 3200	Lexmark TS300	OKI C4500	Samsung Quick over 40,000
Minimum resolution (dpi)	1,200 x 600	1,200 x 600	1,200 x 600	600 x 600	600
Print speed	4 ppm	4 ppm	4 ppm	4 ppm	4 ppm
Print pages per minute	40	40	40	40	40
Version driver	5.0/6.0/7.0/8.0	5.0/6.0/7.0/8.0	5.0/6.0/7.0/8.0	5.0/6.0/7.0/8.0	5.0/6.0/7.0/8.0
OS (32-bit)	Mac	Mac/Win/Unix/Linux	Mac/Win/Unix/Linux	Mac/Win/Unix/Linux	Mac/Win/Unix/Linux
Processor	500 MHz, 1.5 GHz, 2.0 GHz	500 MHz, 1.5 GHz, 2.0 GHz	500 MHz, 1.5 GHz, 2.0 GHz	500 MHz, 1.5 GHz, 2.0 GHz	500 MHz, 1.5 GHz, 2.0 GHz
Memory standard (MB)	16 MB/32 MB	16 MB/32 MB	16 MB/32 MB	16 MB/32 MB	16 MB/32 MB
Additional memory type	DDR	DDR	DDR	DDR	DDR
Interface standard	USB, FireWire, IEEE 1394	USB, FireWire, IEEE 1394	USB, FireWire, IEEE 1394	USB, FireWire, IEEE 1394	USB, FireWire, IEEE 1394
Interface optional	IEEE 1394	IEEE 1394	IEEE 1394	IEEE 1394	IEEE 1394
Standard input tray	25	25	25	25	25
Standard output tray	25	25	25	25	25
Standard paper capacity (sheets)	500	500	500	500	500
Accepts legal sheets	yes	yes	yes	yes	yes
Accepts envelopes	yes	yes	yes	yes	yes
Accepts transparencies	yes	yes	yes	yes	yes
Accepts labels	yes	yes	yes	yes	yes
Accepts card stock	yes	yes	yes	yes	yes
Roll-in feeding	yes	yes	yes	yes	yes
Accommodates additional paper type	yes	yes	yes	yes	yes
Input/output ports	yes	yes	yes	yes	yes
Only color (print per page)	1000	1000	1000	1000	1000
Color (print per page)	1000	1000	1000	1000	1000
Resolution (dpi)	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600
Minimum print consumption (ppm)	14.4	14.4	14.4	14.4	14.4
Print	14.4	14.4	14.4	14.4	14.4
Print cartridge cost	1000	1000	1000	1000	1000
Cost per page	1.00	1.00	1.00	1.00	1.00
Warranty	1 year	1 year	1 year	1 year	1 year
Support website	yes	yes	yes	yes	yes
Web site	www.brother.com	www.brother.com	www.brother.com	www.brother.com	www.brother.com

Lexmark: \$29 = estimated street price, \$89 = suggested retail price.

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Printing by Inner Light

Continued from page 51

The T520 also offers both networking and display options, but the basic printer ups the speed to 25 ppm, from the T520's 20 ppm.

Typical setup of the printer was fairly quick, mostly requiring removal of protective shipping tape. The software setup was

also fairly straightforward using the installation program (the printer doesn't feature USB plug-and-play type driver installation).

Getting the printer onto the network was very easy as well. We sent out the printer's enclosed summary to verify that DHCP was enabled, and as we noted the server, it obtained an IP address and automatically joined our configuration sheet to let us

know the details... very quick.

Installing network drivers on the client PC was a bit more painful, however, requiring the manual installation of a new network port based on the IP number of the printer. Once these were set up, however, we were able to start printing right away.

Printing our 48-page test document took roughly two minutes and 30 seconds at least

quality (1,200-dpi), the test output of which was extremely crisp throughout. Dropping the quality to 300 dpi made the edges of the text a bit more ragged, but still very readable. During printing, we also tried out the printer's "Sleep" button, which will pause a print if you need to reload paper or if you need to access the job, and it waked just fine.

As with other Lexmark products, you have a range of options with the replacement cartridges. The T520 series ships with a 5,000-page starter cartridge, but you can replace it with either a 7,500-page cartridge or a 20,000-page high-yield cartridge. Both of these cartridges are available in "Prestar" models, which are cheaper but require the return of the empty cartridges to Lexmark following use.

Bottom line, they're not cheap, though the 7,500-page cartridge is \$339 (ECP in Prestar version), and the 20,000-page cartridge is a hefty \$409 (\$419 Prestar). Although the pricing is in line with other monochrome in terms of cost per page, these numbers may be a bit high for those who are buying the T520 as an entry-level laser printer. For those more looking for a relatively affordable printer for a business setting, however, it's easier to push the higher prices.

Old Cartridge Life

From: Chiba

My LexmarkT520

Suggested retail price: \$249

Cartridge replacement cost: 14¢ per page / 12¢ per doc



- 30 pages
- LED electrophotographic printing
- 600-dpi color resolution
- 4 MB standard memory; 36 MB maximum
- PCL 6
- 250-sheet paper input tray; fast of two trays (optional) to accommodate legal-size paper
- Paper feed rollers on both input tray
- Parallel and USB connections (local, network, and networking optional)
- Compatible with Windows 9x/NT/2000, and Mac OS

Over the years, we've used a lot of inkjet printers, though we appreciate the reasons for the drop, we're not particularly kind of Chiba's toner cartridge and drum setup in position. While most manufacturers have opted for an all-in-one laser and drum cartridge for laser printers, Chiba separates them.

The reason for doing this is the lower cost, instead of replacing the entire unit, you can replace just the old toner component and replace it all by itself (14¢ instead of more than \$300). However, the way Chiba has the cartridge set up, the toner is easily applied, especially if you have to move the drum unit off by itself and there's toner left in the reservoir.

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Taming knowledge management monsters

Solutions help small firms mine their databases, manage email overload

By Tom Ichniowski

The knowledge management marketplace has been steadily growing over the last few years. Framingham, Mass.-based International Data Corp. recently predicted that the demand for KIM solutions will likely increase worldwide from 130,000 million in 1999 to a 120,613 billion in 2004.

Before knowledge management is discarded, however, most people assume that the solution are available only for large-scale corporate buyers.

The perception is not unfounded, according to a recent paper on the knowledge management market by Antecore Systems, a U.K.-based information management specialist and chief executive officer of Iyflon Associates. In the report, *Smaller Sized Companies Use Knowledge Management*, Ichniowski argues that until very recently, developers of knowledge management solutions ignored smaller businesses. For these developers, Ichniowski writes, "small companies are apparently not a study



market, and the large companies market is far from exhausted."

However, Ichniowski points out that small companies are in much as need of knowledge management solutions as large enterprises, and for many of the same reasons.

Small companies want to be more competitive and one of the best ways to do that is to exploit the knowledge locked away in their networks and organize the vast amounts of information that comes in every day.

Herridon, Virg.-based, Semantics, Inc.

(<http://www.semantics.com>) believes it has a solution—its KIM Web Server—that helps companies better query the information that often sits in multiple databases.

"There is a lot of structured and unstructured bits of information in various repositories in a company, and the ones at large to access that information and leverage the knowledge," says Michael Chen, vice-president of marketing and business development for Semantics.

Accessing those repositories can mean logging into different systems, using different interfaces, and remembering multiple passwords, Chen says. Other into the darkness, there can still be the unenviable task of manually organizing the information to make it of any use.

According to Chen, workers can access all of those databases through a single interface with the KIM Web Server. It uses a cross-language query engine that accepts natural language requests. The query engine first

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Microsoft extends .NET to wireless intranets

ATLANTA, Ga.—Microsoft (<http://www.microsoft.com>) has announced the latest stage in its on-the-go .NET Internet server strategy, namely the porting of its .NET Web server software to a mobile phone intranet server environment.

The technology, known as the Mobile Information 2001 (MI 2001) server, had its first public showing in June at the Microsoft TechEd 2000 event in Atlanta.

Paul Fawcett, senior vice-president of Microsoft's .NET Enterprise Server Division, told the 11,000-plus delegates at the event that the mobile applications server, which extends the Microsoft Exchange server environment to company mobile phone-based intranet applications, is now available to third-party companies.

Several wireless carriers are acting as intranet, value-added providers for the MI 2001 server. These include AT&T Wireless and Verizon Wireless in the U.S., Vodafone Phoenix in Spain and Vodafone (<http://www.vodafone.com>) in the U.K. All of these firms are planning to offer MI-based services to their customers later this year.

Backing up these involve an array of systems integrators that are busy developing MI 2001 applications software. These include Accenture/Manville, Cap Gemini Ernst & Young, CompuLink, CSC, Extreme Logic, Hendrix Packard, IBM Global Services, and KPMG International.

Scott Gode, marketing director for Microsoft's, Continued on page 34



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At the heart of the release is the new Linux 2.4 kernel. There has been dramatic progress in Linux at the kernel level between 2.2 and 2.4, particularly in areas that matter significantly to enterprise computing.

There are too many advances in the 2.4 kernel to list them all, but some of the notable ones are support for up to eight on-board processors and 64 GB RAM, standard firewall rules using iptables, and expanded support for USB devices — both storage and hot-pluggable. There is also support for Ethernet devices.

The X Window environment has been moved up to XFree86 4.0.3 which adds support for many new video cards and offers improvement in 3D graphics. Multimedia support has been improved and expanded.

Overall, this is a well-appointed vehicle with something for both the corporate and the home user. If you're running an older system of Red Hat that is missing any features you're interested in, upgrading to Red Hat 7 is recommended. There is no further reason to hold back.

Package options

For some time now Red Hat has been bundling its wares into different packages aimed at different markets, and growing them accordingly.

The "Standard" box contains the base installation CD, an installation floppy disk, and a printed Installation Guide. "Deluxe Workstation" adds more documentation, a PowerTools CD, a Documentation CD,

(HBO/TVS etc.), plus a CD-bill of commercial packages (mostly demos) of things like *Swain's Office*, *Bohannon's Publisher* and *Lola* games.

The Professional Server package includes all of the preceding, plus a new Red Hat Customization Guide and a Server Applications CD with trial versions of things like Cold Fusion and ArcServe for Linux.

Pricing? Red Hat has been criticized for charging more than other distributions and I am in agreement that most of what's included in the "Deluxe Workstation" should be included in the Standard package, splitting the difference in price between the two. The distinction between Standard and Deluxe is artificial.

However, as defense of Red Hat it should be pointed out that Red Hat is still free for anyone who wants to download the CD ISO images and burn their own discs. This does not include the commercial trial software, of course. The purchased packages come with 30-day support.

Another popular option is purchasing newly labelled and packaged Red Hat 7.1 ISO downloads from vendors such as Cheapbytes (<http://www.cheapbytes.com>) or Linux Central (<http://linuxcentral.com>). The version of 7.1 that I am reviewing here was purchased from Cheapbytes.

My first CD set, including installations #1 and #2, Documentation, Source and PrewsTech came to US\$12.49, including \$5 shipping in Canada. This is roughly equivalent to the Unifree Workstation package, minus the printed manuals, 30-day support, and commercial trial-software CDs.

Something old, something new

When I install Red Hat I normally use the "text" install. It avoids the problem of a graphical install not being recognized properly. I've been using "text" since version 4.0 and am happily comfortable with it.

When Red Hat released 5.2, text installation began using a back seat to the new graphical install option. Somebody at Red Hat must have been seeing the complaints. I'm happy to report that text installation has been re-installed and returned to its former position. Once upon you can get individual package information during installation, as text used

Equally important, Red Hat has returned Linux to a standard partitioning option. Although Dark Devil, the most capable but less functional partitioner is getting better, it never works as well for us as traditional Linux.

The latest graphical install is also excellent. I used it twice on two different machines and it correctly recognized video cards and chose variable options for the install. One of these machines was an IBM Thinkpad that totally messed up on a graphical install with 4.2. I have no difficulty recommending the graphical install as a solid and convenient option for those who prefer it to the text install.

In an effort to make installation simpler for Linux novices, Red Hat has put together high-level installation clones: Workstation, Server, Laptop, and Console. Read the accompanying material very carefully if you choose anything other than Console. Server class, for instance, will blow away any other partitions on your PC, including your Windows partitions. Workstation and Laptop will blow away any existing Linux

profitable, but will leave Windows alone.

Even if you are okay with Workstation and logging removing old Linux partitions, do not choose either of these options if you're installing on a Windows NT or Windows 2000 computer that is using the NTFS filesystem.

By default these installs will put the LEO boot program into MBR which can prevent you from booting NT or 2000. This is not well documented, nor are you given an option of where LEO is placed. LEO should be installed in the first sector of your start or boot partition in that case—in options only available with Custom.

As always, the best installation chart is Crutons. This is Lotus the way it was meant to be: you make all the decisions. Be sure, when selecting Crutons to also click Select Individual Packages at the appropriate time because Red Hat makes some decisions you

For a very long time Red Hat has focused GNOME over KDE and PostgreSQL, over MySQL. To its credit Red Hat has included a very recent version of KDE2 and MySQL, finally included in the distribution. But you have to select them—nothing is installed by default.

If you're using MySQL, you will also need to make individual selections in the Languages section in order to install a version of PHP and Perl DBD that supports MySQL.

You can make GNOME or KDE your default graphical interface. Some of the older X Window managers are also available but for some obscure reason Red Hat has not

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[illegible]

